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10/775,785	02/10/2004	Haixin Yang	EL0479USNA	9363

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WILMINGTON, DE 19805

EXAMINER

SHOSHO, CALLIE E

ART UNIT	PAPER NUMBER
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1714

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07/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/775,785	Applicant(s) YANG, HAIXIN	
	Examiner Callie E. Shosho	Art Unit 1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/25/07 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 has been amended to recite "polyvinylpyrrolidone homopolymer, polyvinylpyrrolidone copolymer or mixtures thereof of 1(b) is further comprised of other polymers selected from the group consisting of polymethacrylates and polyacrylates". The scope of the claim is confusing because it is not clear how one type of polymer, i.e. polyvinylpyrrolidone homopolymer, polyvinylpyrrolidone copolymer or mixtures thereof, can

comprise another different type of polymer, i.e. polymethacrylates or polyacrylates. Clarification is requested.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 8-10, 12, and 14-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirai (U.S. 2003/0146019).

Hirai discloses ink jet ink comprising 1-50% conductive functional material such as gold, silver, copper, cobalt, etc., solvent such as aliphatic alcohol, and polyvinyl pyrrolidone dispersed in the solvent. The conductive material possesses average particle size of 1-100 nm. The polyvinyl pyrrolidone is present in amount of 0.1-2 times the amount of functional material. It is disclosed that the ink possesses viscosity of 1-20 cP at 25 °C. There is also disclosed ink jet printer cartridge comprising the ink. It is further disclosed that the ink is printed onto substrate such as glass and that the ink is applied to substrate using ink jet printing to produce line width greater than 10 microns and line thickness of 0.1-10 microns (paragraphs 15-16, 19, 26-27, 31, 35, 47-49, 53, 75-76, and 84). Attention is drawn to example 6 that discloses ink jet ink comprising 12% copper particles, polyvinyl pyrrolidone, and methanol solvent wherein the ink

has viscosity of 10.5 cP. It is disclosed that the weight ratio of polyvinyl pyrrolidone to copper is 0.35 and thus, it is calculated that the amount of polyvinyl pyrrolidone present is approximately 4.2%. Although there is no explicit disclosure of the amount of solvent utilized, given that the polyvinyl pyrrolidone is present in amount of 4.2% and the copper present in amount of 12%, it is calculated that the solvent is present in amount of approximately 84%.

Although there is no explicit disclosure that the ink exhibits stability up to 24 hours and may be jetted without further agitation, given that Hirai discloses ink identical to that presently claimed, it is clear that the ink would also inherently possess same stability and jettability as presently claimed.

In light of the above, it is clear that Hirai anticipates the present claims.

6. Claims 1-3, 5, 8-10, 12, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 19846096.

DE 19846096, an English translation of which was provided by applicants, discloses ink jet ink comprising 10-99% solvent comprising water and/or organic solvent such as aliphatic alcohol, ethylene glycol, etc., 0.05-80%, preferably 0.5-20%, conductive functional material that is metal oxide, and 0.1-20%, based on the amount of metal oxide, of at least one dispersant such as polyvinyl pyrrolidone and acrylic resin that is dispersed in the solvent. It is disclosed that the ink possesses viscosity less than 20 mPas. It is further disclosed that in one embodiment the conductive material is in the form of agglomerates and possesses average particle size of less than 500 nm and in another embodiment the conductive material possesses average particle size of 1-100 nm. It is also disclosed that the ink is printed onto substrate such as glass (page 2, lines

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1-2, page 2, line 15-page 3, lines 9, col.3, lines 11-14 and 21-25, page 3, line 26-page 4, line 1, page 5, line 7, page 6, lines 4-6, page 7, line 16-page 9, line 15, page 10, lines 5 and 13-26, page 12, lines 18-20, and col.17, line 7 after the table). It is disclosed that the ink is applied to substrate using ink jet printer which would inherently possess cartridge containing the ink as presently claimed.

Although there is no explicit disclosure that the ink exhibits stability up to 24 hours and may be jetted without further agitation, given that DE 19846096 discloses ink identical to that presently claimed, it is clear that the ink would also inherently possess same stability and jettability as presently claimed.

In light of the above, it is clear that DE 19846096 anticipates the present claims.

7. Claims 1-3, 5, 8-12, and 14-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kudas et al. (U.S. 2003/0175411).

Kudas et al. disclose ink jet ink comprising 5-50% conductive material including silver, gold, copper, platinum, nickel, or metal resinate such as silver neodecanoate, solvent such as alcohol or terpene, acrylic resin, photoinitiator, and not greater than 10% polyvinyl pyrrolidone. It is disclosed that the ink possesses viscosity of 10-40 cP. The conductive material is in the form of nanoparticles having average size not greater than about 100 nm and/or micron-size particles having average particle size greater than about 0.1 μm , preferably 0.3- 3 μm . Given that the solvent functions as the ink vehicle, it is clear that the solvent is inherently present in amount as presently claimed. Further, given that all the ingredients are mixed together to form the ink, it is clear that the polyvinyl pyrrolidone is dispersed in the solvent. It is further disclosed the ink is

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printed onto substrate such as glass and that the composition is applied as a line width of 100 microns and line thickness of about 1 micron using ink jet printing (paragraphs 3, 19, 22-27, 30-32, 85, 117-118, 126-127, 131, 135, 141, 143, 283, 295-297, 301, 325-326, 348-349, 354, 365, and 434). It is disclosed that the ink is applied to substrate using ink jet printer which would inherently possess cartridge containing the ink as presently claimed.

While it is disclosed that the composition remains stable for at least one hour, there is no explicit disclosure that the ink exhibits stability up to 24 hours and may be jetted without further agitation. However, given that Kudas et al. disclose ink identical to that presently claimed, it is clear that the ink would also inherently possess same stability and jettability as presently claimed.

In light of the above, it is clear that Kudas et al. anticipate the present claims.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai (U.S. 2003/0146019) in view of Zhu et al. (U.S. 6,251,175).

The disclosure with respect to Hirai in paragraph 5 above is incorporated here by reference.

The difference between Hirai and the present claimed invention is the requirement in the claim of poly(meth)acrylate.

Hirai disclose that the ink comprises binder (paragraph 31).

Zhu et al., which is drawn to ink jet inks, disclose the use of binder that is acrylic resin in order to produce ink with rapid dry time (col.4, lines 9-13 and col.5, lines 29-31 and 53).

In light of the motivation for using acrylic resin disclosed by Zhu et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use acrylic resin in the ink of Hirai in order to produce ink with rapid dry time, and thereby arrive at the claimed invention.

10. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodas et al. (U.S. 2003/0175411) in view of Adkins et al. (U.S. 6,379,444).

The disclosure with respect to Kodas et al. in paragraph 7 above is incorporated here by reference.

The difference between Kodas et al. and the present claimed invention is the requirement in the claim of specific monomer.

Kodas et al. disclose the use of monomer (paragraph 27), however, there is no explicit disclosure of type of monomer utilized.

Adkins et al., which is drawn to ink jet ink, disclose the use of monomer such as trimethylolpropane tri(meth)acrylate in order to enhance curability of the ink (col.10, lines 29-64).

In light of the motivation for using monomer disclosed by Adkins et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use of such monomer in the ink of Kodas et al. in order to enhance curability, and thereby arrive at the claimed invention.

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai (U.S. 2003/0146019) or Kodas et al. (U.S. 2003/0175411) either of which in view of Shioi et al. (U.S. 4,657,591).

The disclosures with respect to Hirai and Kodas et al. in paragraphs 5 and 7 above are incorporated here by reference.

The difference between Hirai or Kodas et al. and the present claimed invention is the requirement in the claim that the conductor material is coated with fatty acid surfactant.

Shioi et al., which is drawn to inks, disclose that it is well known to coat metal powder with fatty acid surfactant such as stearic acid in order to form thin and continuous layer of metal on the surface of coating (col.3, lines 1-11).

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In light of the motivation for coating conductor material with fatty acid disclosed by Shioi et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to coat the conductive functional material of Hirai or Kudas et al. with fatty acid in order to produce ink with thin and continuous layer of metal on the surface, and thereby arrive at the claimed invention.

12. Claims 1-3, 5-6, and 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tucker et al. (U.S. 2007/0117884).

Tucker et al. disclose ink jet ink comprising dielectric material, i.e. titanium dioxide, 5-10% binder obtained from vinyl pyrrolidone as well as (meth)acrylates such as hydroxy C₁-C₆ alkyl ester of (meth)acrylic acid, photoinitiator, UV curable monomer, i.e. ethylene glycol methacrylate, and 60-99% solvent such as alcohol or ethylene glycol. It is disclosed that the ink possesses viscosity less than 50 cP, preferably 30 cP or less (paragraphs 2, 10, 25, 32-33, 34 (line 4), 42 (line 23), 45, 50, 91, 98, and 101). It is disclosed that the ink is applied to substrate using ink jet printer which would intrinsically possess cartridge containing the ink as presently claimed.

While Tucker et al. fails to exemplify the presently claimed invention nor can the claimed invention be "clearly envisaged" from Tucker et al. as required to meet the standard of anticipation (cf. MPEP 2131.03), nevertheless, in light of the overlap between the claimed composition and the composition disclosed by Tucker et al., it is urged that it would have been within the bounds of routine experimentation, as well as the skill level of one of ordinary skill in

the art, to use composition which is both disclosed by Tucker et al. and encompassed within the scope of the present claims and thereby arrive at the claimed invention.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tucker as applied to claims 1-3, 5-6, and 9-14 above, and further in view of Adkins et al. (U.S. 6,379,444).

The difference between Tucker and the present claimed invention is the requirement in the claim of specific monomer.

Adkins et al., which is drawn to ink jet ink, disclose the use of monomer such as trimethylolpropane tri(meth)acrylate in order to enhance curability of the ink (col.10, lines 29-64). Further, Adkins et al. disclose the equivalence and interchangeability of using ethylene glycol diacrylates as disclosed by Tucker with using trimethylolpropane tri(meth)acrylate as presently claimed.

In light of the motivation for using specific monomer disclosed by Adkins et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use of such monomer in the ink of Kodas et al. in order to enhance curability, and thereby arrive at the claimed invention.

14. Claims 1-3, 8-10, 12-15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozee et al. (U.S. 7,147,801).

Kozee et al. disclose ink jet ink comprising dielectric material, i.e. titanium dioxide, 5-20% vinyl pyrrolidone copolymer, photoinitiator, and 30-99% solvent such as alcohol. It is disclosed that the ink possesses viscosity of 1.6-7 cP (col.1, lines 20-22, col.4, lines 61-64,

col.16, line 48, col.20, lines 25-26, col.21, lines 18-20, 25-30, and 51, col.22, lines 41-46, and col.25, lines 6-17). It is disclosed that the ink is applied to substrate such as glass or plastic using ink jet printer which would intrinsically possess cartridge containing the ink as presently claimed.

While Kozee et al. fails to exemplify the presently claimed invention nor can the claimed invention be “clearly envisaged” from Kozee et al. as required to meet the standard of anticipation (cf. MPEP 2131.03), nevertheless, in light of the overlap between the claimed composition and the composition disclosed by Kozee et al., it is urged that it would have been within the bounds of routine experimentation, as well as the skill level of one of ordinary skill in the art, to use composition which is both disclosed by Kozee et al. and encompassed within the scope of the present claims and thereby arrive at the claimed invention.

Response to Arguments

15. Applicant’s arguments filed 4/25/07 have been fully considered but they are not persuasive.

Specifically, applicant argues that DE 19846096 is not a relevant reference against the present claims given that there is no disclosure in DE 19846096 that the conductive material has an average particle size (D50) of 0.1 to 1.2 microns.

However, it is noted that DE 19846096 discloses that the conductive material has average primary particle size of 100 nm, which clearly overlaps the presently claimed average particle size. Even though the overlap is only at one point, the fact remains that there is overlap. DE 19846096 also discloses that the conductive material is in the form of agglomerates that possess

average particle size of less than 500 nm (col.3, lines 13-14 and 21-25), which also clearly overlaps the average particle size presently claimed. Thus, both the primary particle size and the agglomerate particle size of the conductive material of DE 19846096 overlap the average particle size presently claimed.

Applicant also argues that DE 19846096 does not disclose viscosity of the ink as presently claimed.

However, attention is drawn to page 12, lines 18-20 of DE 19846096 that discloses that the ink possesses viscosity of less than 20 mPas.

Applicant also argues that there is no disclosure in DE 19846096 that the ink is stable for up to 24 hours as presently claimed.

However, although there is no explicit disclosure that the ink exhibits stability up to 24 hours, given that DE 19846096 discloses ink as presently claimed, it is clear, absent evidence to the contrary, that the ink would also inherently possess same stability as presently claimed.

Applicant argues that Kodas et al. is not a relevant reference against the present claims given that Kodas et al. disclose the use of conductive material that is nano-sized particles mixed with precursor composition while applicant's claims are directed to jet composition with large particles and low viscosity.

However, attention is called to paragraphs 31-32 of Kodas et al. that disclose that the conductive material is in the form of microparticles possessing average particle size of at least about 0.1 μm , preferably 0.3 – 3 μm which clearly meets the requirements in the present claims with respect to particle size. Further, attention is called to paragraph 349 of Kodas et al. that

discloses that the composition has viscosity of not greater than 50 cP such as 10 to 40 cP, which clearly meets the requirements in the present claims regarding the viscosity. Further, while it is agreed that the composition of Kodas et al. is a precursor composition, there is nothing in the scope of the present claims that excludes the use of such composition. The present claims are drawn to ink jet printable composition. Given that paragraphs 298 and 325-326 of Kodas et al. disclose that the composition is printed onto substrate using ink jet printer, it is clear that the precursor composition of Kodas et al. is ink jet printable as presently claimed.

Applicant also argues that there is no disclosure on Kodas et al. that the ink is stable for 24 hours as presently claimed.

However, although there is no explicit disclosure that the ink exhibits stability up to 24 hours, given that Kodas et al. discloses ink as presently claimed, it is clear, absent evidence to the contrary, that the ink would also inherently possess same stability as presently claimed.

As evidence to support their position, applicants point to paragraphs 45 and 54 of Kodas et al. that disclose that the hollow micron-size particles remain suspended or stable for at least an hour.

However, given that the present claims require that the ink is stable for “up to 24 hours”, which clearly includes all values up to 24 hours including at least one hour and given that the disclosure of Kodas et al. that the composition remain stable for “at least one hour” which includes values greater than one hour, it appears that the composition of Kodas et al. does meet the requirement of the present claims with respect to stability time.

Applicant also argues that Kodas et al. do not meet the requirements of the present claims with respect to the viscosity given that no temperature is disclosed in Kodas et al. with respect to

the viscosity and given that Kodas et al. disclose that the composition may be heated to reduce viscosity.

However, attention is drawn to paragraph 349 of Kodas et al. that discloses that in order for the ink to be used in an ink jet, the viscosity must not be greater than 50 cP such as 10-40 cP. Given that the composition of Kodas et al. is effectively utilized in ink jet printer and thus, is an ink jet printable composition as presently claimed, it is clear that the composition would inherently have the same viscosity at the same temperature as presently claimed.

Applicant also argues that Hirai et al. is not a relevant reference against the present claims given that Hirai et al. do not disclose conductive material with average particle size as presently claimed.

However, it is noted that Hirai et al. disclose that the conductive material possesses average particle size of 1-100 nm, which clearly overlaps the presently claimed average particle size. Even though the overlap is only at one point, the fact remains that there is overlap.

Thus, it is clear that the conductive material of Hirai et al. does possess average particle size as presently claimed.

Applicant also argues that Shioi is not a relevant reference against the present claims given that the present invention does not contain the dyestuffs and pigments disclosed by Shioi.

However, on the one hand, it is noted that Shioi is not used for its teaching of pigments and dyestuffs. It is noted that Shioi is used as teaching reference, and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed

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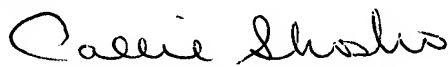
invention, *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973), *In re Keller* 624 F.2d 413, 208 USPQ 871, 881 (CCPA 1981). Rather this reference teaches a certain concept, namely, that it is well known to coat metal powder with fatty acid surfactant such as stearic acid, and in combination with the primary reference, discloses the presently claimed invention.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 571-272-1123. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CS
7/8/07


Callie E. Shosho
Primary Examiner
Art Unit 1714